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The Arrangement of Atoms in Space. By J. H. VAN'T HOFF. Second, Revised and Enlarged Edition. With a Preface by JOHANNES WISLECENUS, and an Appendix, Stereochemistry among Inorganic Substances, by ALFRED WERNER. Translated and Edited by ARNOLD EILOART. London, New York and Bombay, Longmans, Green & Co. Pp. xi + 211.

In the earlier development of theories with regard to the structure of chemical compounds, chemists were very careful to state that the formulæ used were not intended to represent, at all, the actual geometrical positions of the atoms within the molecules. It was with a great deal of scepticism, therefore, that the chemical world received the first attempts at a logical discussion of the arrangement of atoms in space. These attempts were made by van't Hoff and by Le Bel, independently, in 1874. For many years the theory made little headway and, at most, received some notice in connection with the discussion of optically active substances. Gradually, however, the theory proved so useful that the present situation is well summarized in the following words of Professor Wislecenus from his preface to this book:

"The old opposition to the principle has almost died out; where it still lives it is directed against the ultimate basis—against the Atomic Hypothesis itself—and does not deny that the doctrine of atomic arrangement in three dimensions is a logical and necessary stage, perhaps the final stage, in the chemical theory of atoms. * * * It has already effected to the full all that can be effected by any theory; for it has brought into organic connection with the fundamental theories of chemistry facts which were before incomprehensible and apparently isolated, and also enabled us to explain them from these theories in the simplest way. By propounding to us new problems, the new theory has stimulated empirical investigations on all sides; it has caused a vast accumulation of facts, has led to the discovery of new methods of observation, has become amenable to the tests of experiment, and has at the same time started in our science a movement full of significance—in a certain sense, indeed, a new epoch."

The present work is a new and thoroughly revised edition of van't Hoff's well-known book. It is especially satisfactory in its discussion of stereoisomerism in its relation to optical activity. The consideration of ethylene derivatives and of ring compounds is also sufficiently full, while the concise treatment of the stereochemistry of nitrogen compounds accords well with the present rather unsatisfactory conditions of the topic. The brief statement by Alfred Werner of his views upon the stereoisomerism of certain inorganic compounds is an important and valuable addition.

The present book is noteworthy for the manner in which the fundamental conception is reduced to the simplest possible expression. All hypotheses which are not absolutely essential are omitted. In this respect the book is in marked contrast with that of Auwers on the same subject.

In a few cases, and especially for camphor and atropine and their derivatives, structural formulæ are given which are, to say the least, very improbable, if not entirely impossible, according to our present knowledge. While questions of optical activity are undoubtedly of great importance in the discussion of possible formulæ for these compounds, it seems unfortunate that such doubtful formulæ should have been used in the consideration of the fundamental principles of asymmetry as connected with optical activity.

The work of translation has been well done, and the translator, who is an authority on the subject, has added several important notes of his own.

W. A. NOYES.

Laboratory Experiments on the Class Reactions and Identification of Organic Substances. By ARTHUR A. NOYES and SAMUEL P. MULLIKEN. Second, Thoroughly Revised Edition. Easton, Pa., Chemical Publishing Co. Pp. 28. Price, 50 cents.

This little book may be considered as the elements of qualitative analysis for organic compounds. Because of the enormous number of these compounds the subject is not susceptible of any such set mechanical treatment as is usually given to inorganic qualitative analysis. For this reason it is all the more useful for the purpose of developing thoughtfulness and

originality on the part of the student. The work is intended to supplement the instruction in organic preparations, which has been found by the authors to "fail, to a surprising extent in the case of most students, to give a knowledge of the important characteristics of the various classes of organic compounds, and, therefore, of the fundamental principles of the science." The selection of reactions and the method of treatment are excellent, and the book will prove a very useful one. The number of reactions might, of course, be easily extended; especially is it desirable to include Liebermann's reaction for secondary amines and the general reactions for vegetable alkaloids. It would also be an advantage if the names by which some of the reactions are constantly known to chemists were given, and an occasional reference to the literature would be very useful.

W. A. NOYES.

SCIENTIFIC JOURNALS.

American Chemical Journal, July: 'A Reduction of Permanganic Acid by Manganese Peroxide:' By H. N. MORSE and C. L. REESE. The relative action of manganese peroxide and hydrogen in causing the reduction of potassium permanganate has been studied and the results compared with those obtained by Meyer and Von Recklinghausen. 'The Atomic Weight of Cadmium:' By H. N. MORSE and H. R. ARBUCKLE. The atomic weight has been redetermined and a correction introduced for the gas retained by the oxide. The mean corrected value is 112.377. 'A Table of Atomic Weights:' By T. W. RICHARDS. This table has been compiled from a comparison of the best results obtained in atomic weight work, the probable chemical accuracy of the processes being the criterion. 'Researches on the Cyclo Amides: α -Ketobenzomorpholine and α -Benzparaioxazine Derivatives:' By H. L. WHEELER and B. BARNES. 'The Action of Amines on Acylimidoesters: Acyl Amidines:' By H. L. WHEELER and P. T. WALDEN. 'On a New Form of Water Blast:' By B. B. BOLTWOOD. The author has devised a form which gives a high efficiency with a small amount of water. 'On the Periodic System and the Properties of Inorganic

Compounds:' By J. LOCKE. The author discusses the Periodic System and shows that the usual arrangement, which is very satisfactory when we only consider the behavior of the elements themselves, is very unsatisfactory when we compare the properties of the compounds of these elements. 'The Action of Sulphur upon Metallic Sodium:' By J. LOCKE and A. AUSTELL. This investigation shows that the monosulphide cannot be formed by direct combination at temperatures below 220°. 'On Some Compounds of Trivalent Vanadium:' By J. LOCKE and G. H. EDWARDS. 'The Conductivity of Aqueous Solutions of Praseodymium and of Neodymium Sulphates:' By H. C. JONES and H. M. REESE. This number also contains a note on the preparation of Liquid Hydrogen, which was obtained by Professor Dewar, who also liquefied helium by introducing a tube of the gas into the liquid hydrogen.

J. ELLIOTT GILPIN.

THE *American Naturalist* for June opens with an article on the fresh-water biological stations of America, by Dr. Charles A. Kofoid. The relative advantages of marine and fresh-water stations are commented on, and a description is given of the Lake Laboratory of the Ohio State University, prepared by the late Professor D. S. Kellicott, of the Biological Station of the Indiana University by Professor Carl Eigenmann, and of the Illinois Biological Station. Professor H. C. Bumpus contributes an article on the identification of fishes artificially hatched, in which he makes an interesting application of the statistical method of representing variations. The series of papers on the wings of insects by Professor Comstock and Dr. Needham is continued, and Dr. V. Sterki writes on the classification of *Ciliate Infusoria*.

NEW BOOKS.

Plant Life considered with Special Reference to Form and Function. CHARLES R. BARNES. New York, Henry Holt & Co. 1898. Pp. x + 428.

A Brief Course in Qualitative Analysis. ERNEST A. CONGDON. New York, Henry Holt & Co. 1898. Pp. iv + 62.